OpenSignal, Inc
26081 Merit Circle, Ste 119
Laguna Hills, CA, 92653

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Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Guidance on Open Internet Transparency Rule Requirements
GN Docket No. 14-28

Comments of OpenSignal

OpenSignal, Inc ("OpenSignal") applauds the Commission's decision to consider a methodology that makes use of crowdsourced data "safe harbor"[1] and by doing so recognize that crowdsourced measurements represent an evolution of network testing that enables the typical experience of mobile consumers to be measured more accurately than ever before. OpenSignal does however recommend that the Commission adopts other providers of crowdsourced network measurements as "safe harbor", particularly those with a long and recognized history in collecting and analyzing such data, such as OpenSignal. OpenSignal has years of experience collecting crowdsourced data and has built up a vast body of knowledge and algorithms for analyzing it. In addition, OpenSignal collects a volume of data that is multiple orders of magnitude greater than that collected in the Measuring Broadband America ("MBA") program, which is a limitation of the MBA program that has drawn criticism[2]. Finally, as a pioneer of crowdsourced on-device network testing OpenSignal can provide some points of clarification on this methodology as some of the comments submitted to the Commission on this methodology have been ill-informed.

OpenSignal and crowdsourced data for network experience measurements

OpenSignal is the leading provider of crowdsourced on-device network experience measurements globally. With over 15 million users contributing data to date, OpenSignal

[1] Guidance on Open Internet Transparency Rule Requirements, GN Docket No. 14-28, Public Notice, DA 16-569 (rel. May 19, 2016) ("Public Notice")
[2] CTIA and Competitive Carriers Association Ex-Parte Presentation, GN Docket No. 14-28, GN Docket No. 12-264, and WT Docket No. 16-137, (filed August 10, 2016) ("CTIA and CCA Ex-Parte Presentation").

represents the largest independent dataset on holistic network experience globally. In addition to the various performance parameters mentioned by the Commission, OpenSignal measures many more and has developed detailed analytical capabilities to derive insights from these measurements. OpenSignal provides these insights to leading Mobile Network Operators ("MNOs"), telecoms regulators and industry analysts all around the world. OpenSignal also regularly publishes reports on mobile experience in both the US and worldwide which are openly available on the OpenSignal website[3] in addition to regularly updated real-world, measured coverage maps of major MNOs globally on the OpenSignal website[4] and Mobile Apps[5].

OpenSignal urges the Commission to exercise caution in interpreting comments made by parties who do not have credible experience and understanding of crowdsourced data. For example, some comments claim that crowdsourced data cannot measure KPIs relating to call experience, which is plainly false and indicates poor understanding of the potential of crowdsourced testing. OpenSignal is prepared to make itself available to the Commission should the Commission want to make use of the expertise OpenSignal has developed in this field to clarify any of the salient points.

Typical experience measurements require completely different testing & analysis methodology compared to network capacity measurements

The consumer experience of mobile networks is dependent on a wide range of different factors including, but not limited to, radio network performance, core network performance, inter-connection with other network & transport providers and the device used including the hardware, software and application layers of that devices. Typical experience tests, such as those leveraged by OpenSignal, measure and represent this complete end-to-end experience picture. They are designed to reflect what a typical consumer can expect to receive on an everyday basis. Network capacity tests, such as those employed by drive-test providers and some crowdsourced data providers, test only a portion of the end-to-end experience. These tests are designed to reflect *possible* network performance (typically *best-case* performance) and can be a useful diagnostic input for network operators but should not be confused with typical experience tests nor used to inform consumers of what typical experience they can expect.

For example, drive-testing generally employs specialized test equipment more sensitive than consumer devices to measure network performance or, when consumer devices are used, a single high-end model representing best-case performance is commonly selected. In addition, many testing methodologies use dedicated test servers that are typically embedded within a network providers internal network to optimize the connection experience for that test. OpenSignal urges the Commission to draw a strict distinction between these types of testing and recognize that using best-case capacity tests to represent typical experience would mislead consumers by providing inflated results. OpenSignal recommends that only methodologies that measure the true, end-to-end

[3] OpenSignal Public Reports: http://opensignal.com/reports
[4] OpenSignal Coverage Maps: http://opensignal.com
[5] OpenSignal Mobile Apps: http://opensignal.com/app

experience consumers receive should be considered “safe harbor” for reflecting typical experience.

The limitations of simulated testing

Whilst drive-testing and other forms of simulated network testing proved useful when the capability didn’t exist to directly measure network experience at significant scale, the reality is that when it comes to representing typical experience there are serious limitations to drive-test simulations. The modern mobile usage experience is made up of a vast symphony of different locations, situations and behaviors. Details matter and people just a small distance apart; moving compared to stationary; indoors compared to outdoors; or even those in the same place at different times might have wildly different network experiences. Even the manner in which consumers hold their mobile device has been shown to have a significant impact on the experience received[6]. The only way to fully capture the mobile experience is to employ a methodology that sits on the device with the consumer, sees exactly what they see in all these different situations, and does this on a very large scale.

Drive-testing measures only a small sample of locations where consumers might use their phone and by its very nature almost exclusively limits these locations to roads which only reflect a small portion of the mobile experience. Evolved methodologies now include an element of indoor or ‘walk-testing’ but these are limited to an even smaller sample of locations given the overheads of this testing methodology. In addition, this testing is limited to only publically available locations which results in a skewed measurement set as any private residence, office or any other non-public location, which represent a significant proportion of mobile usage, are unavailable to test by this methodology.

Furthermore, drive-test measurements are typically taken over a very short period of time representing a point-in-time snapshot of the network experience in a particular location. Network experience can fluctuate based on the impact of numerous factors ranging from weather patterns to changes in consumer behavior. Consider for example the impact on network congestion of a large crowd gathered to watch a sporting event. A snapshot measurement methodology will therefore offer a skewed view of network experience unless it is measured at a moment reflective of ‘typical experience’ but with so many rapidly changing and overlapping factors OpenSignal would argue that no moment could ever really be considered typical, and instead ‘typical’ is the sum of the impact of all these factors measured over a long period of time and the only way to truly reflect this is with a methodology that tests 24/7 and collects data over months or longer. Finally, given that drive-testing uses specialized equipment it cannot not be considered a representation of consumer experience as it’s not testing significant components of that.

[6] “Absorption Related to Hand-Held Devices in Data Mode”: Andersen, Jørgen Bach; Nielsen, Jesper Ødum; Pedersen, Gert F. - IEEE Transactions on Electromagnetic Compatibility, Vol. 58, No. 1, 2016, p. 47 - 53.

Final Note

OpenSignal, as a leader in crowdsourced data and as the operator of the largest independent panel for holistic network experience measurements, welcomes the opportunity to discuss this matter further with the Commission.

Regards,

Brendan Gill

CEO, OpenSignal